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Dr.HD ui

Claims

- 5 1. A cathode system comprising carbon cathodes and
collectors for the electrolytic production of
aluminum, wherein the cathode system is divided in
the direction of its long axis on the side of the
power conduction from the cathode to the collector
10 into at least two parts having a differing
electrical resistance in such a way that the
electrical resistance from the ends of the collector
to the part of the cathode facing the collector at
the ends of the cathode is at least 1.2 times the
15 electrical resistance from the ends of the collector
to the part of the middle of the length of cathode
facing the collector, where the division of the
cathode system into at least two parts of differing
electrical resistance is achieved by use of
20 different contact compositions between collector and
cathode and/or by dividing the collector in the
direction of its long axis on the side of the power
conduction to the cathode into at least two parts of
differing electrical resistance.
- 25 2. A cathode system as claimed in claim 1, wherein at
least two different contact compositions are used
for establishing electrical contact between cathodes
and collectors, with the boundary between zones of
30 different contact compositions running perpendicular
to the long axis of the collectors, and the contact
resistance between collector and cathode in the
middle of the length of the cathode is lower than

the contact resistance in the region of the ends of the cathode.

3. A cathode system as claimed in claim 2, wherein the
5 contact composition in the region of the middle of the cathode length is cast iron.
4. A cathode system as claimed in claim 2, wherein the
10 contact composition used in the region of the ends of the cathode length is selected from among tars, tar pitches, synthetic resins based on epoxy resins and/or phenolic resins and adhesives based on epoxy resins and/or phenolic resins filled with electrically conductive particles.
- 15 5. A cathode system as claimed in claim 4, wherein the electrically conductive particles are selected from among particulate carbon and metal particles in the form of powders, shoot, fibers, whiskers and/or
20 platelets.
6. A cathode system as claimed in claim 1, wherein the
25 collectors are divided in the direction of their long axis on the side of the power conduction to the cathode into at least two parts having differing electrical resistances in such a way that the electrical resistance from the ends of the collector to the zone of the collector adjacent to the ends of the cathode is at least 1.2 times the electrical
30 resistance from the ends of the collector to the zone of the collector adjacent to the middle of the cathode.
7. A cathode system as claimed in claim 6, wherein the

metallic material of the collector is uniform and the collector is divided into zones of differing cross section which are insulated from each other.

- 5 8. A cathode system as claimed in claim 6, wherein at least two different metals are used for constructing the collector.
- 10 9. A cathode system as claimed in claim 6, wherein a zone of the collector having a higher resistance is configured in the form of a plate facing the cathode side.
- 15 10. A cathode system as claimed in claim 6, wherein a zone of the collector having a higher resistance is configured in the form of a sheath which completely covers the side facing the cathode and the areas of the collector which are in physical contact with the cathode.
- 20 11. A cathode system as claimed in claim 6, wherein the collector is covered by a sheet-like insulator on the areas which face the cathode and consist of zones of differing resistance up to the point where the collector establishes electrical contact.
- 25 12. A process for producing a cathode system as claimed in claim 2, which comprises introducing at least two contact compositions of differing electrical resistance into the recess on the underside of the cathode, with the electrical resistance of the contact composition in the zone facing the middle of the cathode length being lower than that of the contact composition of the zone facing the end of
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the cathode.

13. A process for producing a cathode system as claimed
in claim 3, wherein a contact composition comprising
5 tars, tar pitches, synthetic resins based on epoxy
resins and/or phenolic resins or adhesives based on
epoxy resins and/or phenolic resins filled with
electrically conductive particles is used in the
region of the ends of the cathode and contact in the
10 region of the middle of the cathodes is established
by filling the join with cast iron.
14. A process for producing a cathode system as claimed
in claim 6, wherein an angular metal bar is machined
15 so as to remove material from the surface of at
least one area facing the cathode and the resulting
depression is covered in an electrically insulated
fashion with a metal plate or metal sheath which is
flush with the original dimension.
- 20 15. A method of use of a cathode system as claimed in
claim 1 in the electrolytic production of aluminum
metal.